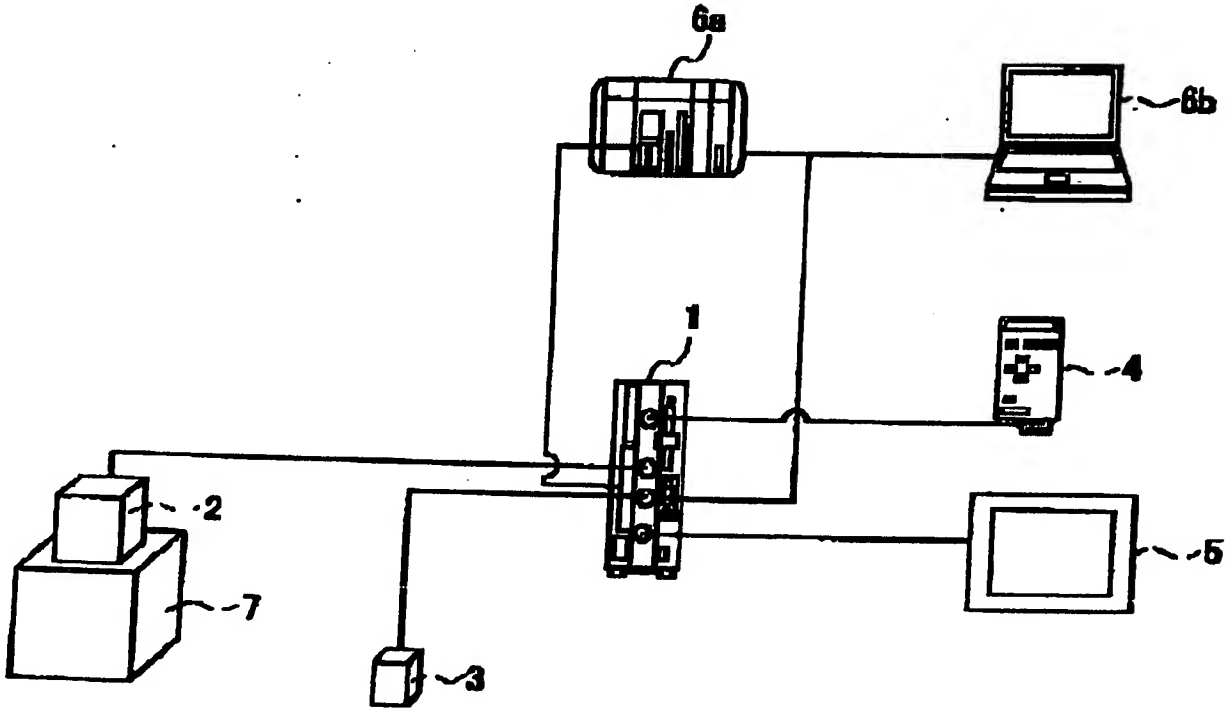

Fig.1

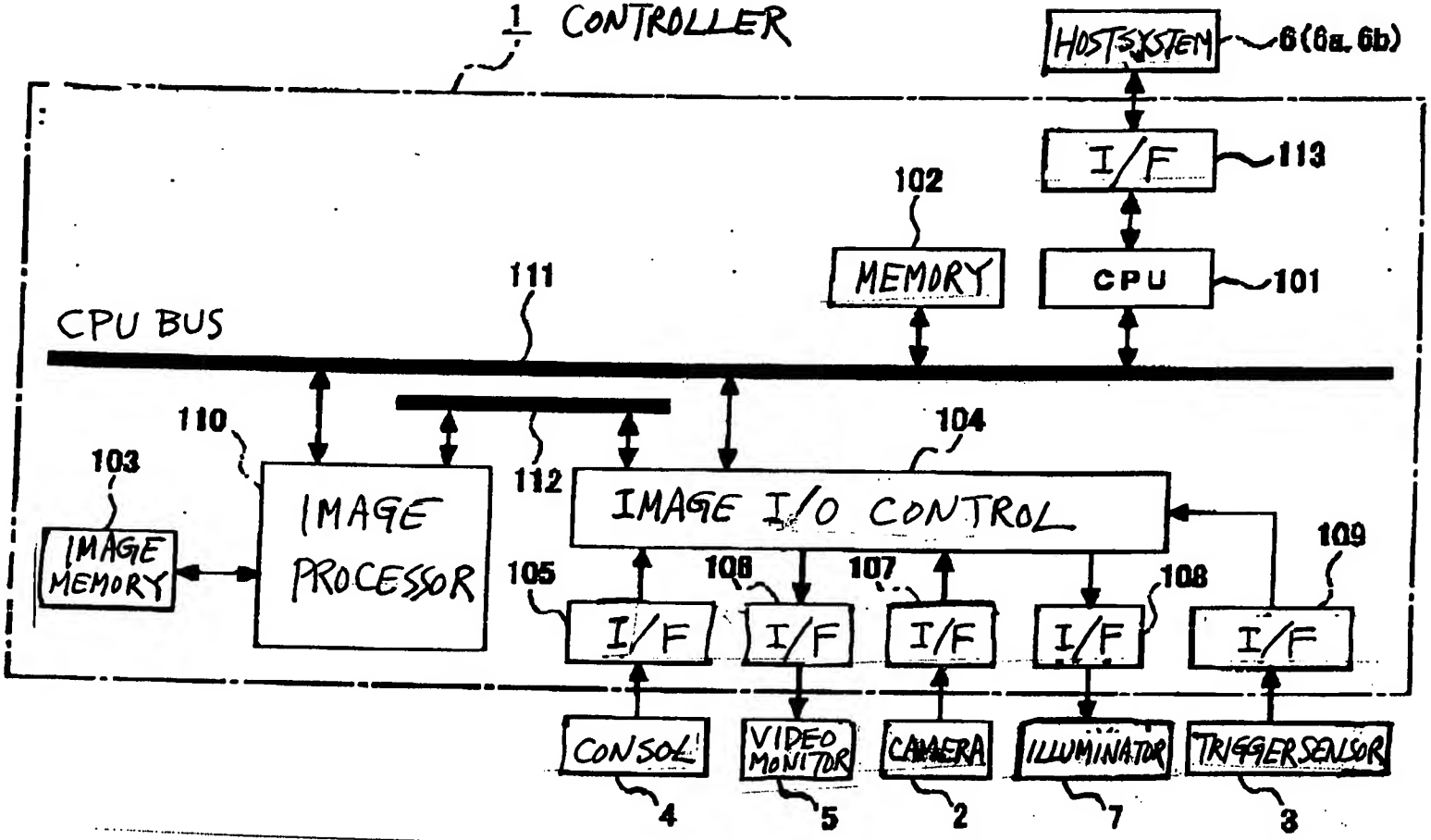
1 CONTROLLER
HOST SYSTEM
6 (6a, 6b)
I/F
113
102
MEMORY
CPU
101
111
CPU BUS
110
103
104
112
IMAGE MEMORY
IMAGE PROCESSOR
IMAGE I/O CONTROL
109
105
106
107
108
I/F
I/F
I/F
I/F
I/F
CONSOL
VIDEO MONITOR
CAMERA
ILLUMINATOR
TRIGGER SENSOR
4
5
2
7
3

Fig. 2

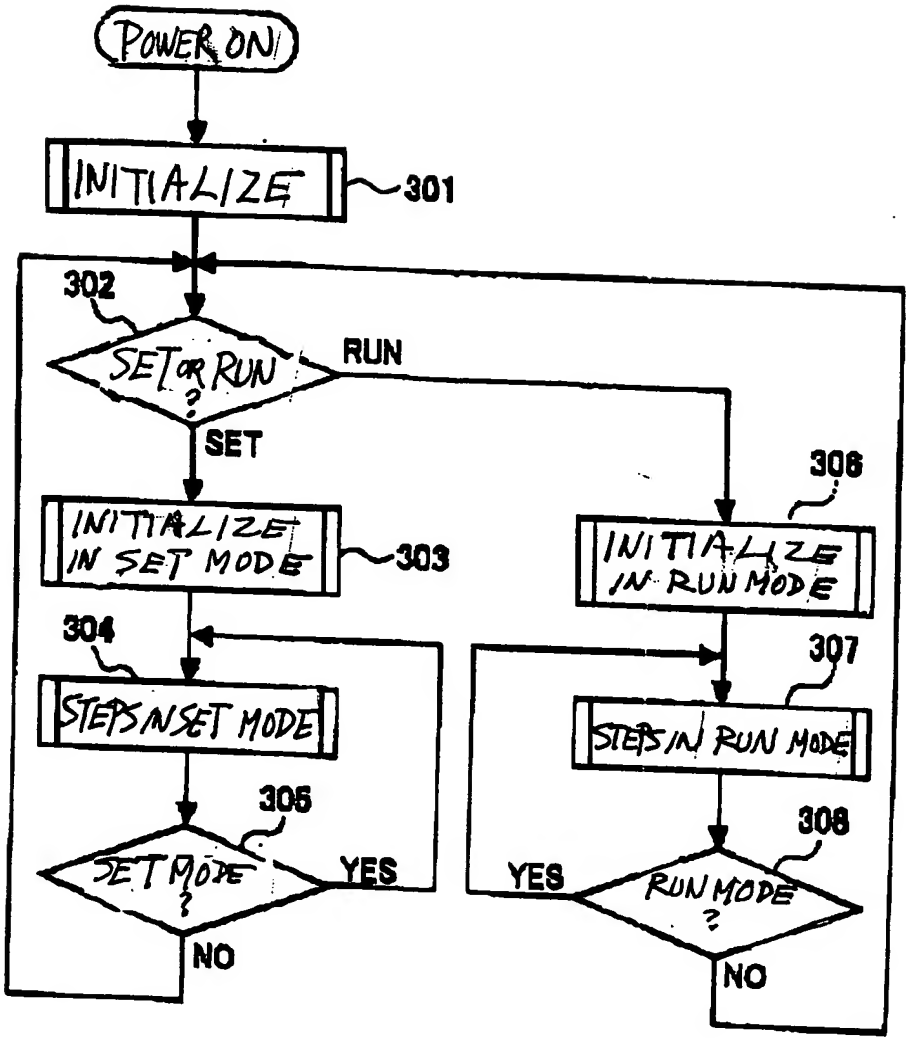
POWER ON
INITIALIZE
301
302
SET OR RUN ?
RUN
SET
306
INITIALIZE IN SET MODE
303
INITIALIZE IN RUN MODE
304
307
STEPS IN SET MODE
STEPS IN RUN MODE
305
308
SET MODE ?
YES
YES
RUN MODE ?
NO
NO

Fig. 3

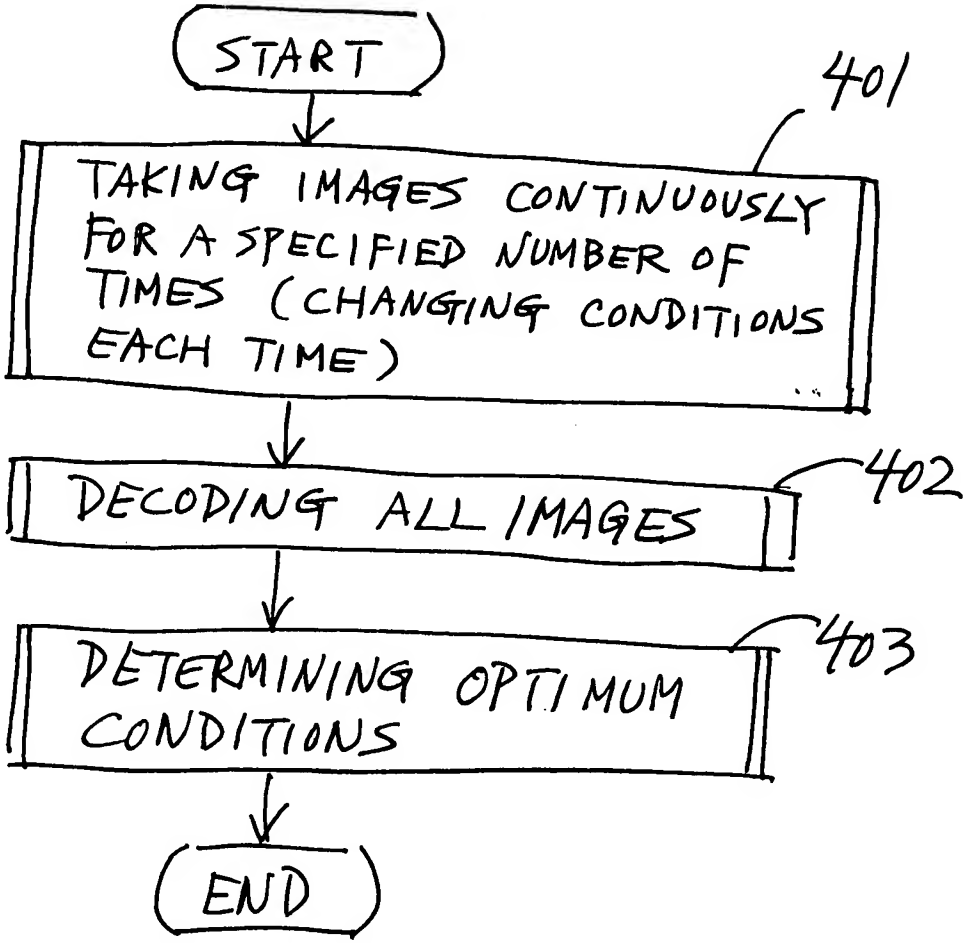
START
401
TAKING IMAGES CONTINUOUSLY FOR A SPECIFIED NUMBER OF TIMES (CHANGING CONDITIONS EACH TIME)
402
DECODING ALL IMAGES
403
DETERMINING OPTIMUM CONDITIONS
END

Fig. 4

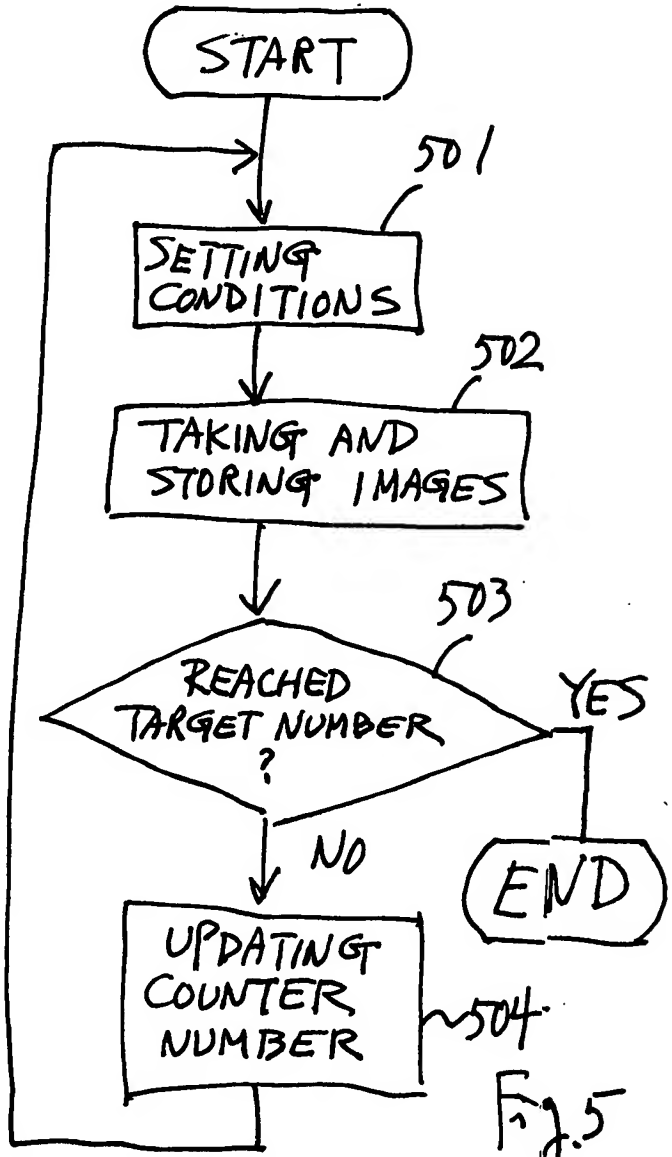
START
501
SETTING CONDITIONS
502
TAKING AND STORING IMAGES
503
REACHED TARGET NUMBER ?
YES
NO
END
UPDATING COUNTER NUMBER
504

Fig. 5

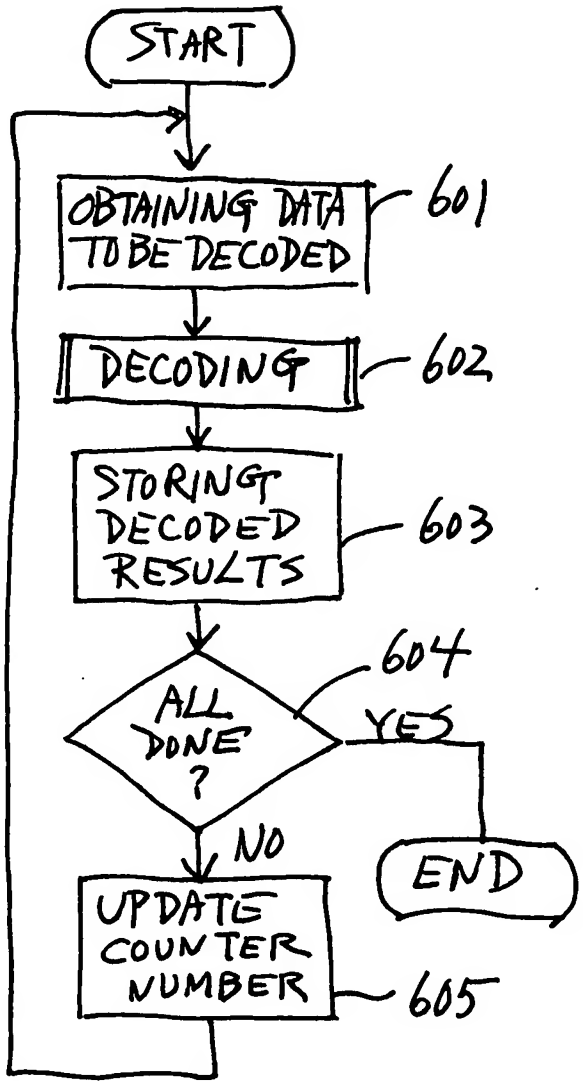
START
OBTAINING DATA TO BE DECODED
601
DECODING
602
STORING DECODED RESULTS
603
ALL DONE ?
604
YES
NO
END
UPDATE COUNTER NUMBER
605

Fig. 6

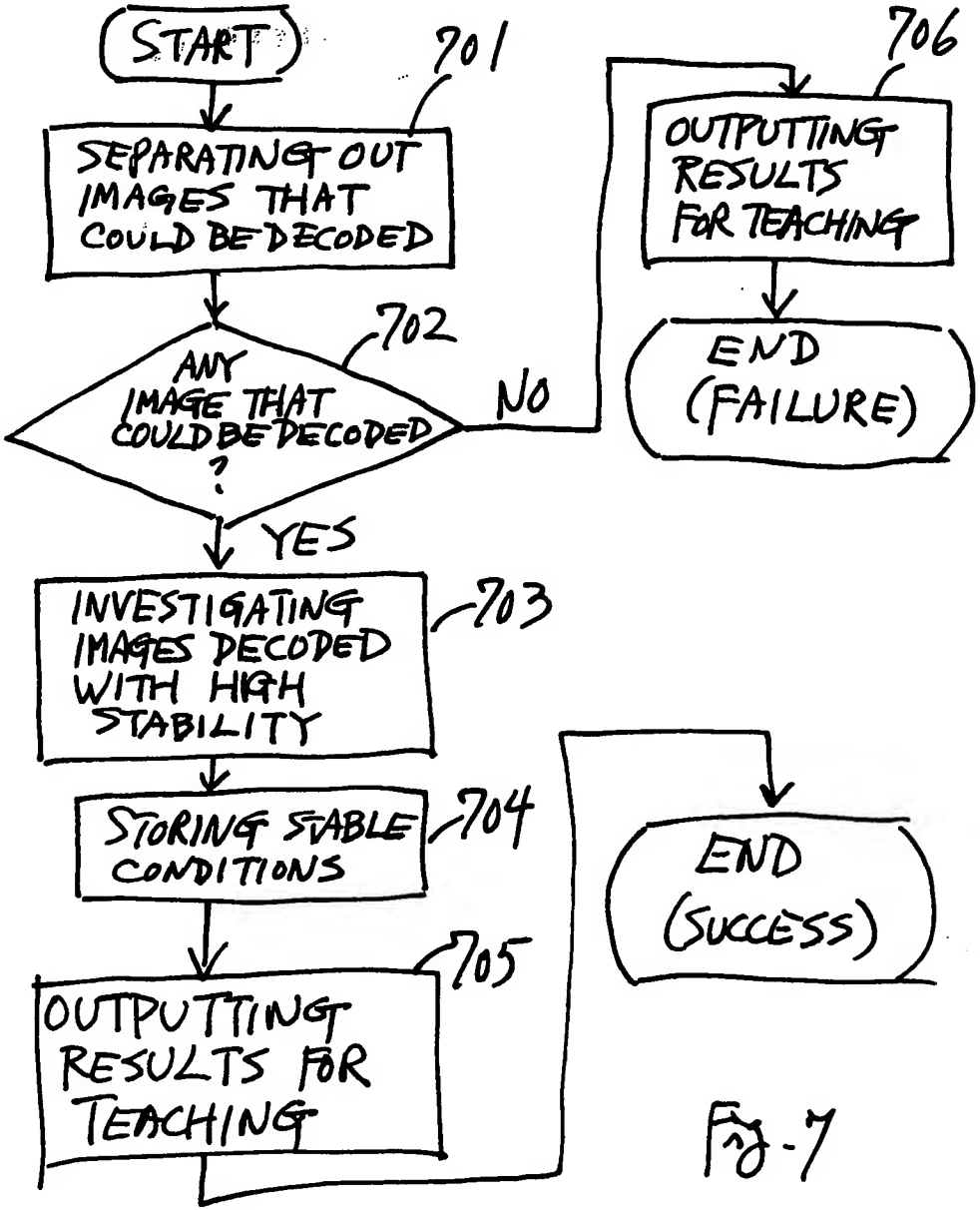
START
701
SEPARATING OUT IMAGES THAT COULD BE DECODED
702
ANY IMAGE THAT COULD BE DECODED ?
NO
706
OUTPUTTING RESULTS FOR TEACHING
END (FAILURE)
YES
703
INVESTIGATING IMAGES DECODED WITH HIGH STABILITY
704
STORING STABLE CONDITIONS
705
OUTPUTTING RESULTS FOR TEACHING
END (SUCCESS)

Fig. 7

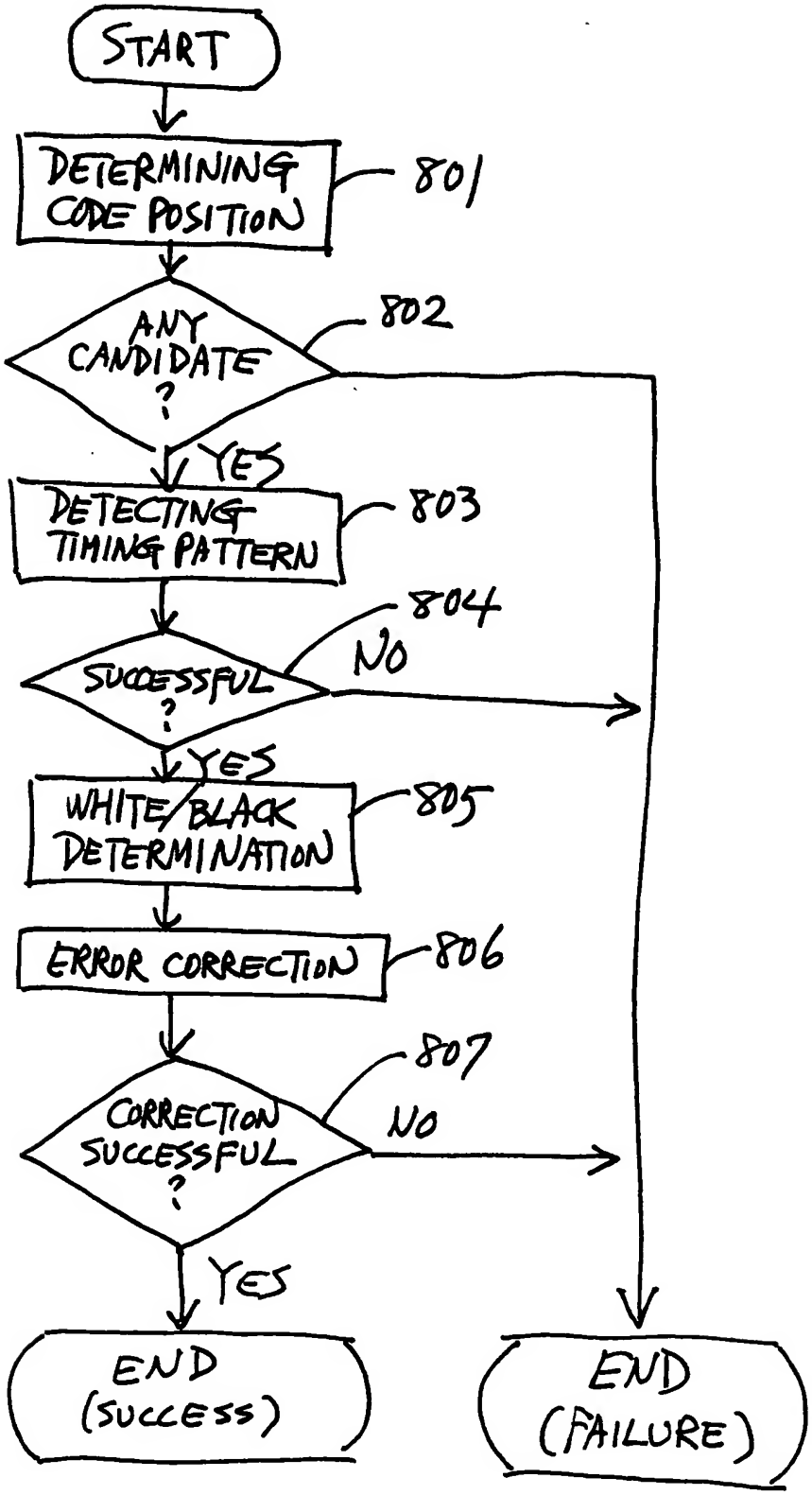
START
DETERMINING CODE POSITION
801
ANY CANDIDATE ?
802
YES
DETECTING TIMING PATTERN
803
SUCCESSFUL ?
804
NO
YES
WHITE/BLACK DETERMINATION
805
ERROR CORRECTION
806
CORRECTION SUCCESSFUL ?
807
NO
YES
END (SUCCESS)
END (FAILURE)

Fig. 8

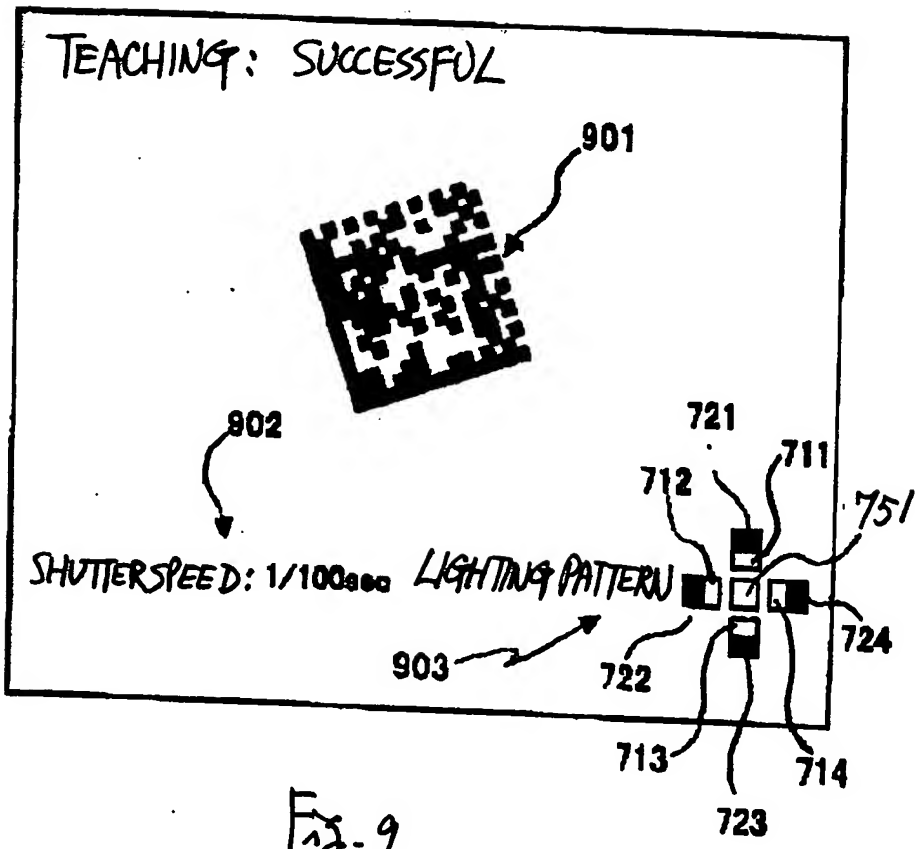
TEACHING: SUCCESSFUL
901
902
721
711
712
751
SHUTTERSPEED: 1/100sec
LIGHTING PATTERN
724
903
722
713
714
723

Fig-9

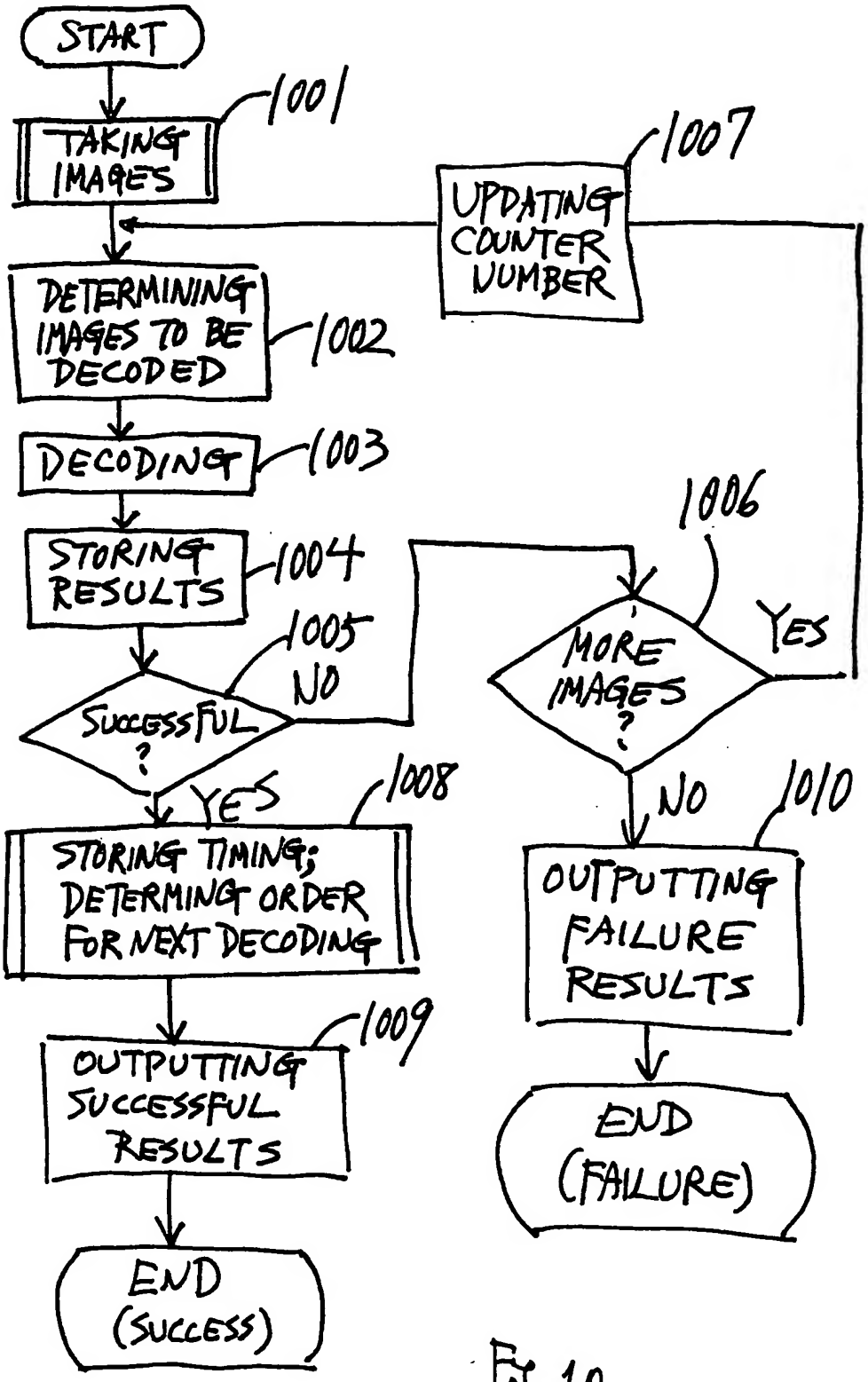
START
TAKING IMAGES
1001
DETERMINING IMAGES TO BE DECODED
1002
DECODING
1003
STORING RESULTS
1004
SUCCESSFUL ?
1005
NO
YES
STORING TIMING; DETERMING ORDER FOR NEXT DECODING
1008
OUTPUTTING SUCCESSFUL RESULTS
1009
END (SUCCESS)
MORE IMAGES ?
1006
YES
NO
UPDATING COUNTER NUMBER
1007
OUTPUTTING FAILURE RESULTS
1010
END (FAILURE)

Fig-10

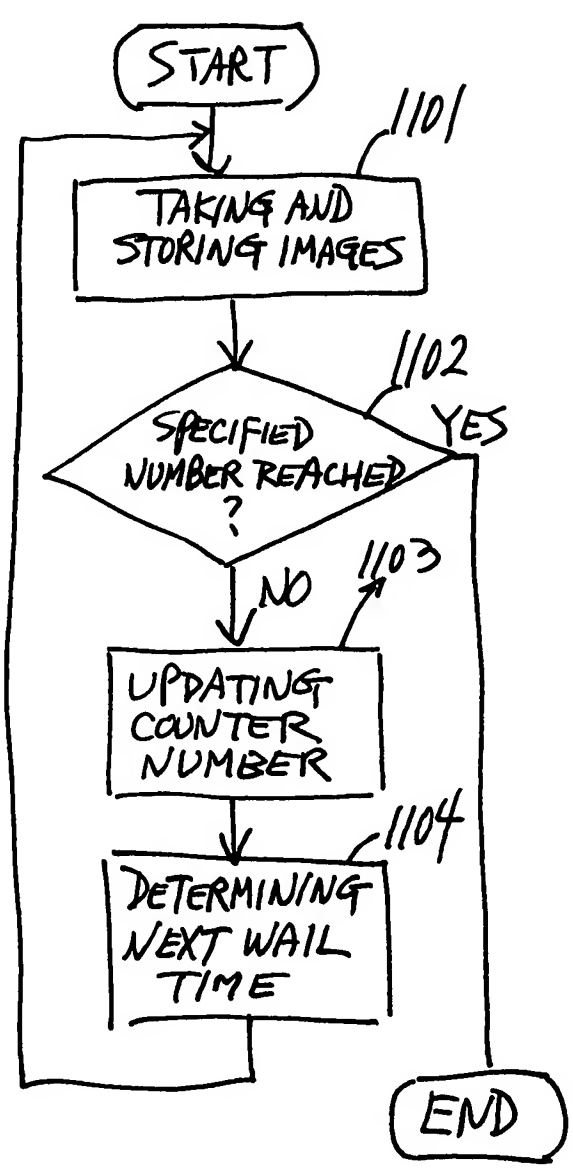
START
1101
TAKING AND STORING IMAGES
1102
SPECIFIED NUMBER REACHED ?
YES
NO
1103
UPDATING COUNTER NUMBER
1104
DETERMINING NEXT WAIL TIME
END

Fig. 11

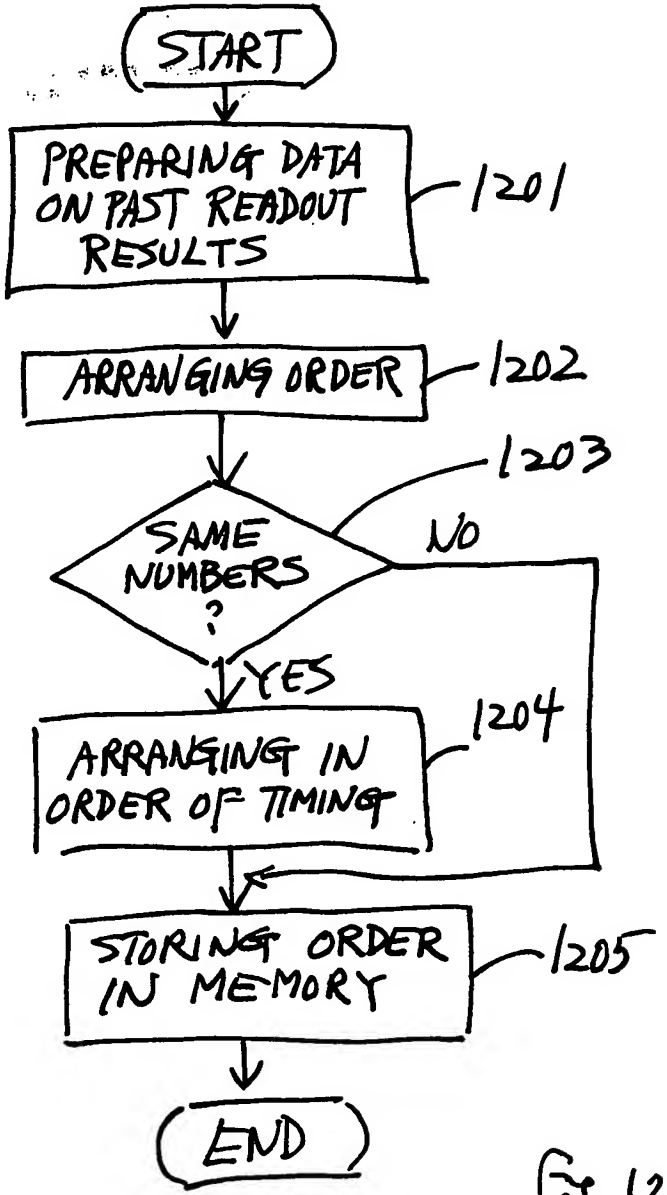
START
PREPARING DATA ON PAST READOUT RESULTS
1201
ARRANGING ORDER
1202
1203
SAME NUMBERS ?
No
YES
ARRANGING IN ORDER OF TIMING
1204
STORING ORDER IN MEMORY
1205
END

Fig. 12

IMAGE No.	RESULT OF PAST READOUT										TOTAL SUCCESS
	100TH	99TH	98TH	97TH	96TH	95TH	94TH	93RD	....	1ST	
1											0
2											0
3			FAILURE	SUCCESS							1
4	FAILURE	FAILURE	SUCCESS				SUCCESS				9
5	SUCCESS	SUCCESS			SUCCESS			SUCCESS		SUCCESS	85
6						SUCCESS					5
7											0

Fig. 13

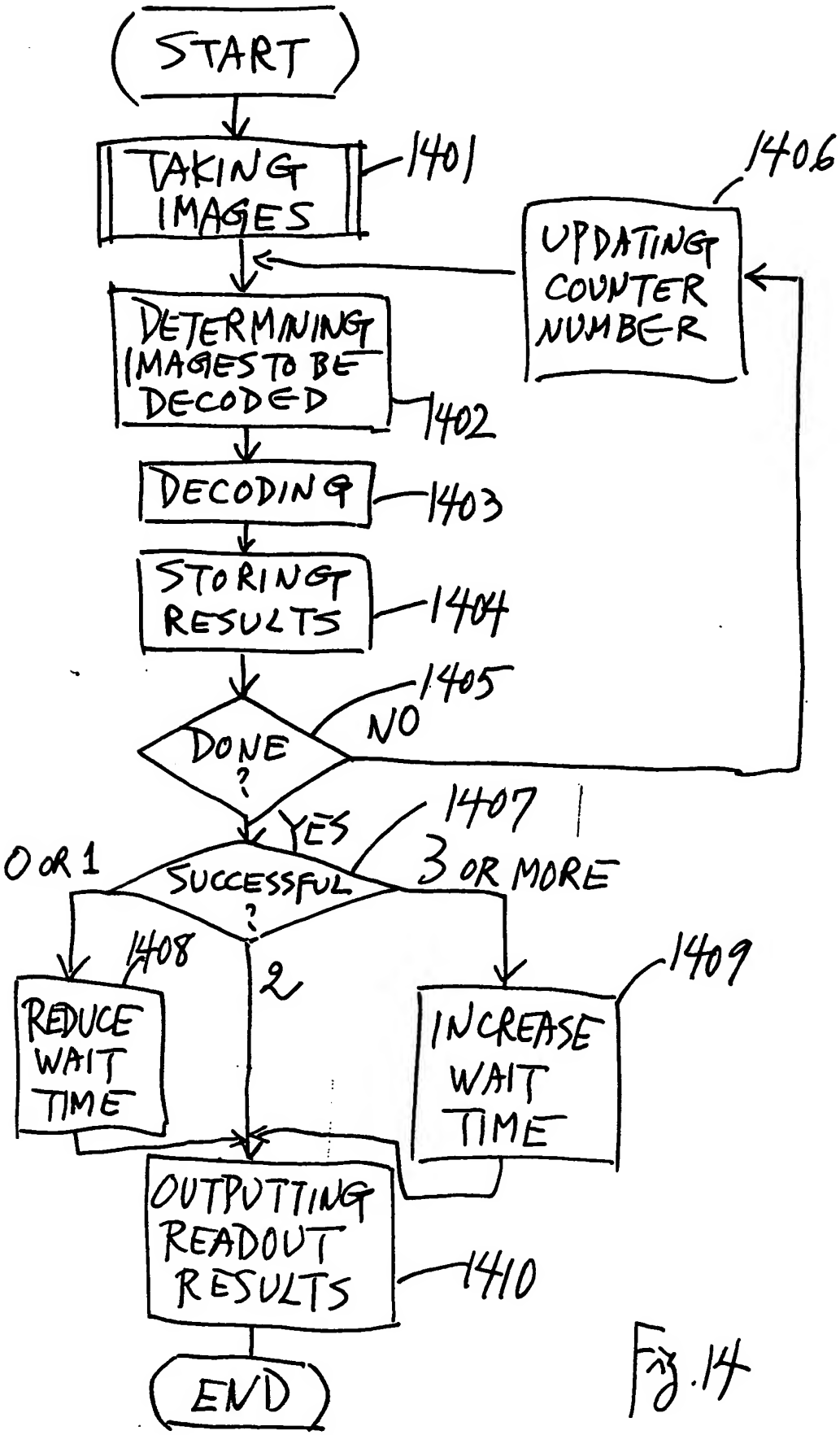
START
TAKING IMAGES
1401
DETERMINING IMAGES TO BE DECODED
1402
DECODING
1403
STORING RESULTS
1404
DONE ?
1405
NO
YES
1406
UPDATING COUNTER NUMBER
SUCCESSFUL ?
1407
0 OR 1
2
3 OR MORE
REDUCE WAIT TIME
1408
INCREASE WAIT TIME
1409
OUTPUTTING READOUT RESULTS
1410
END

Fig. 14

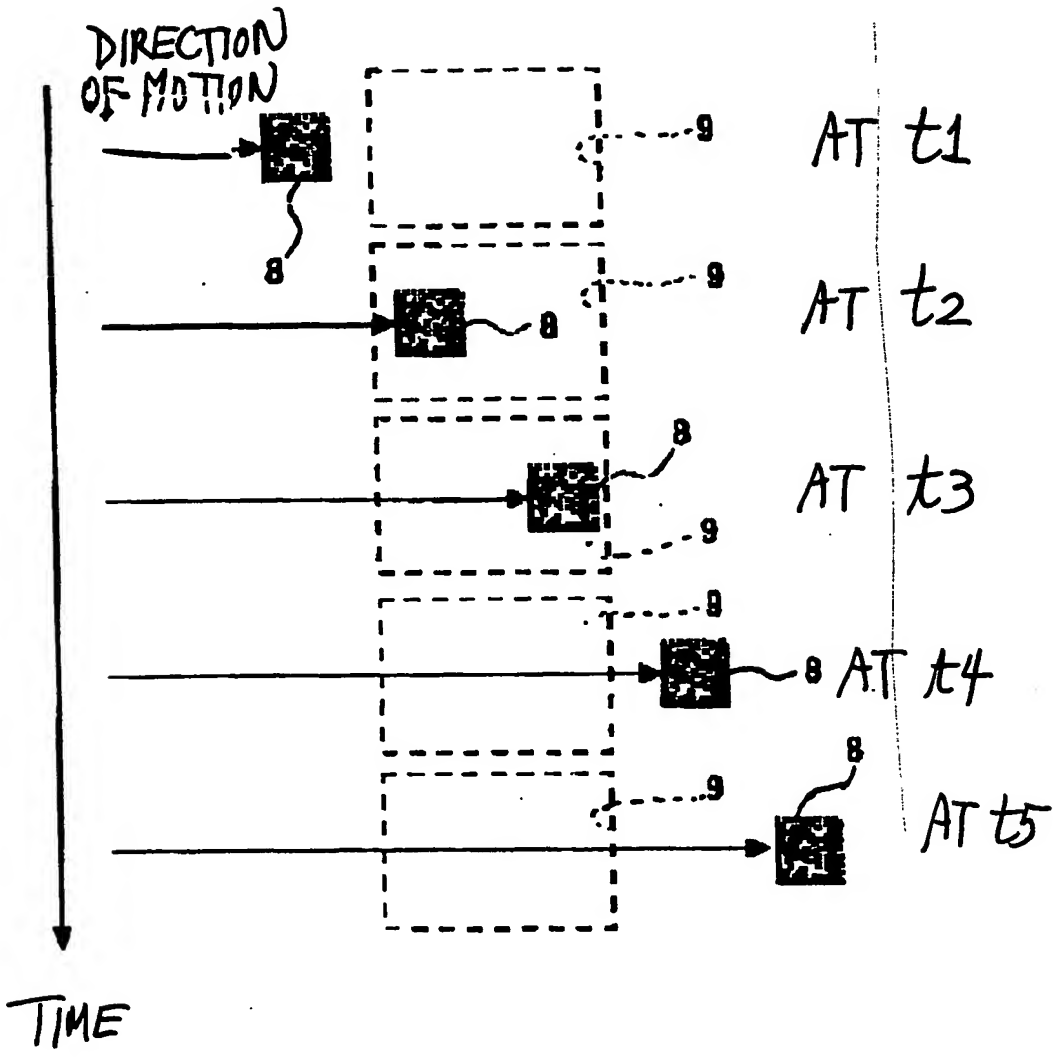

Fig. 15

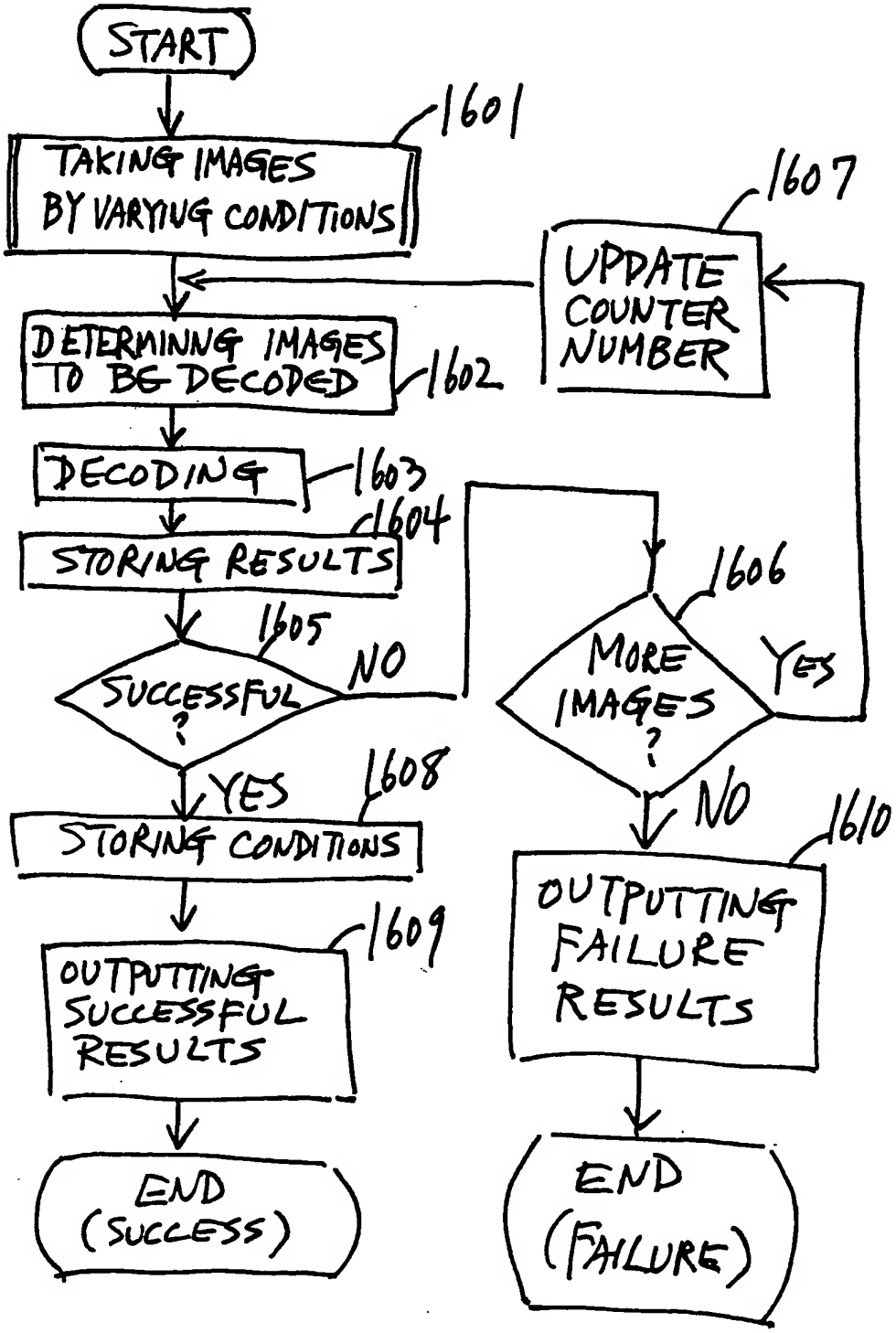
START
TAKING IMAGES BY VARYING CONDITIONS
1601
DETERMINING IMAGES TO BE DECODED
1602
DECODING
1603
STORING RESULTS
1604
SUCCESSFUL ?
1605
NO
YES
STORING CONDITIONS
1608
OUTPUTTING SUCCESSFUL RESULTS
1609
END (SUCCESS)
MORE IMAGES ?
1606
YES
NO
UPDATE COUNTER NUMBER
1607
OUTPUTTING FAILURE RESULTS
1610
END (FAILURE)

Fig. 16

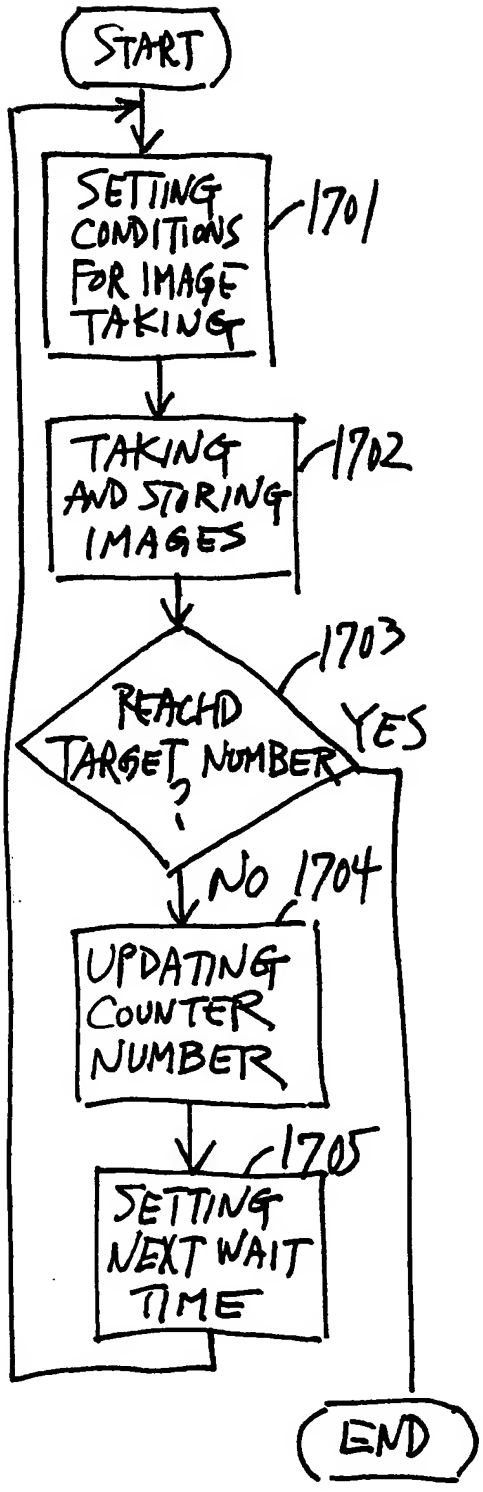

Fig. 17

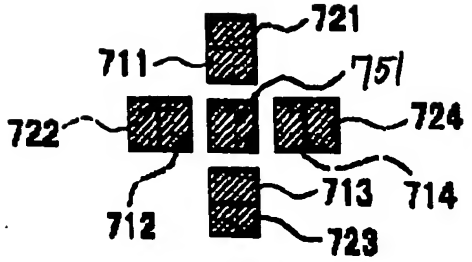

Fig 18A

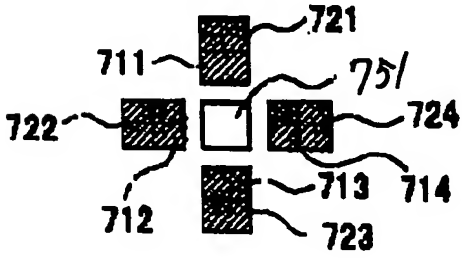

Fig. 18B

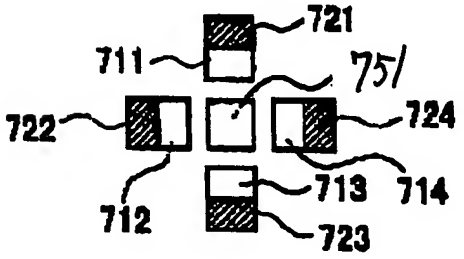

Fig. 18C

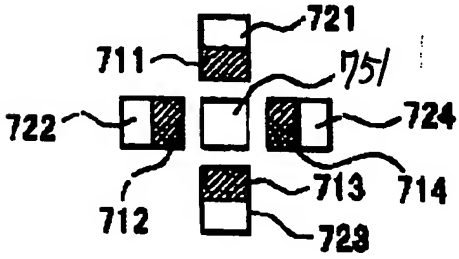

Fig. 18D

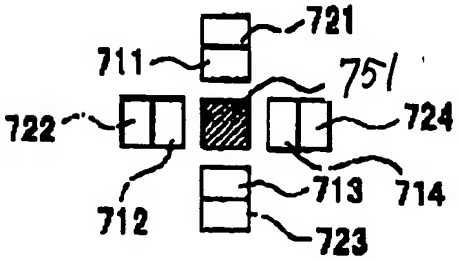

Fig. 18E

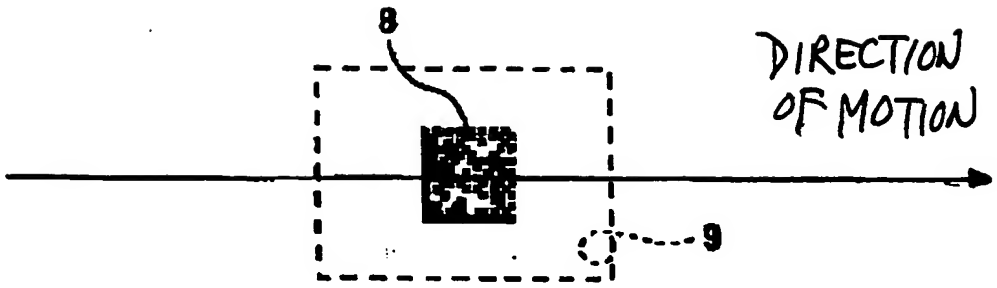

Fig. 19A
(PRIOR ART)

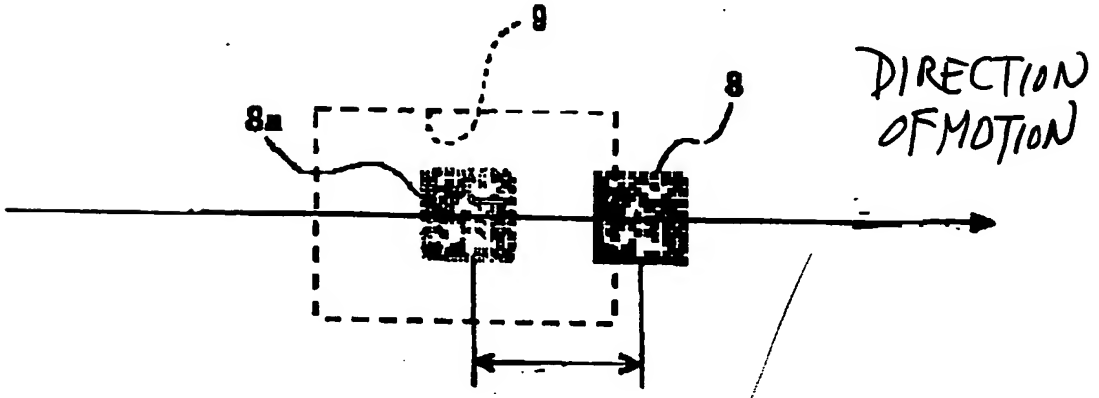

Fig. 19B
(PRIOR ART)